

### **REMARKS**

Claims 1-21 are pending in the application. Claims 1 and 11 have been amended to limit the carboxylic acid compound to those specifically listed. Support for the amendments can be found in the original claims and at, for example, page 4, line 28 to page 5, line 17 of the specification. Claims 5-7 have been amended to more particularly depend from Claim 1. Claims 15-17 have been amended to more particularly depend from Claim 11. The amendments place the application in better form for appeal.

### **Rejections Under 35 U.S.C. 112, second paragraph**

Claims 1-21 stand rejected under 35 U.S.C. 112, second paragraph for being indefinite due for not indicating what aliphatic or aromatic carboxylic acids are intended. Claims 1 and 11 have been amended to recite specific alkyl carboxylic acids and aromatic mono- and di- carboxylic acids are intended. As the claims now clearly recite the intended carboxylic acids, the rejection should be withdrawn.

### **Rejections Under 35 U.S.C. 103(a)**

Claims 1-7 and 11-17 stand rejected under 35 U.S.C. 103(a) as being obvious over U.S. Patent No. 5,580,947 to Brahm et al. (hereinafter "Brahm"). The Examiner alleges that Brahm teaches the elements of the claimed invention with a reasonable expectation of success. Applicants respectfully disagree.

The present invention is directed to a process for preparing a polyisocyanate containing acylurea groups. The process includes the step of reacting an isocyanate with a carboxylic acid compound in the presence of a metal-salt catalyst at a temperature of 20 to 220°C. The carboxylic acid compound is limited to acetic acid, hexanoic acid, cyclohexane carboxylic acid, perhydronaphthalenecarboxylic acid, succinic acid, adipic acid, azelaic acid, dodecanedioic acid, eicosanedioic acid, cyclohexanedicarboxylic acid, aromatic mono- or di- carboxylic acids, and mixtures thereof.

Brahm discloses a process for the production of olefinically unsaturated isocyanates. The process includes reacting an isocyanate component with an olefinically unsaturated reactive component. The isocyanate component includes isophorone diisocyanate and other organic polyisocyanates. The olefinically unsaturated component includes 80-100% olefinically unsaturated carboxylic acids and optionally other monobasic or polybasic carboxylic acids. The olefinically unsaturated alcohols and/or other monohydric or polyhydric alcohols. The reaction can be carried out in the presence of any of a laundry list of catalysts.

The Examiner indicates that the olefinically unsaturated carboxylic acids of Brahm fall within the term "aliphatic carboxylic acids." Applicants have amended the claims to limit the carboxylic acid to embodiments where specific alkyl and aromatic carboxylic acids are used. The selected carboxylic acids effectively exclude the use of olefinically unsaturated carboxylic acids in the present invention.

An object of the present invention was to provide a catalyst for the reaction of isocyanates with carboxylic acids that leads to clear (i.e., without any turbidity) and only weakly colored products (i.e., APHA < 120). This aim was achieved by metal catalysts claimed in the present invention. Brahm does not disclose (explicitly or implicitly) the combination according to the present invention or teaches it to obtain polyisocyanates having acylurea groups exhibiting the desired properties.

There is no disclosure, suggestion, teaching, or motivation in Brahm to make polyisocyanates containing acylurea groups using the presently claimed process or any reasonable expectation of success for obtaining the desired properties. Therefore the rejection of Claims 1-7 and 11-17 under 35 U.S.C. § 103(a) should be withdrawn.

Claims 1-21 stand rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 3,970,600 to Falkenstein et al. (hereinafter "Falkenstein") in view of Brahm. The Examiner indicates that although Falkenstein does not disclose using a catalyst, it would have been obvious to use the catalyst of Brahm in the process of Falkenstein in order to accelerate the reaction.

Falkenstein discloses solutions of isocyanurate-polyisocyanates containing amide and/or acylurea groups in monomeric diisocyanates and/or polyisocyanates which are free from amide, acylurea and/or isocyanurate groups. The isocyanurate-polyisocyanates are obtained by reacting polybasic carboxylic acids with diisocyanates and/or polyisocyanates to give diisocyanates and/or polyisocyanates containing amide groups and/or acylurea groups, converting the diisocyanates and/or polyisocyanates containing amide and/or acylurea groups by trimerization and, optionally, polymerization, into isocyanurate-polyisocyanates containing amide and/or acylurea groups. The products are mixed with monomeric diisocyanates and/or polyisocyanates.

As was indicated above, Brahm directs one skilled in the art to catalysts that are useful when olefinically unsaturated reactants are present. However, Falkenstein discloses that the isocyanates which can be used are aliphatic, cycloaliphatic, aliphatic-cycloaliphatic, araliphatic, cycloaliphatic-aliphatic aromatic and aromatic diisocyanates and/or polyisocyanates (col. 3, lines 30-33). One skilled in the art would not reasonably look to Brahm to identify compositions that would provide alkyl and/or aromatic polyisocyanate containing acylurea groups because Brahm was not directed to such materials. So there is no motivation to combine references as the Examiner has.

The teaching, motivation or suggestion to make alkyl and/or aromatic polyisocyanates containing acylurea groups using the presently claimed process and the reasonable expectation of success for such are not found in the combination of Falkenstein and Brahm. Therefore, the rejection of Claims 1-21 under 35 U.S.C. § 103(a) should be withdrawn.

Claims 1-21 stand rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 4,616,061 to Henning et al. (hereinafter "Henning"). Although the Examiner does not indicate that Henning is taken in view of Brahm, the Examiner states such in the third full paragraph of page 3. The Examiner indicates that although Henning does not disclose using a catalyst, it would have been obvious to use the catalyst of Brahm in the process of Henning in order to accelerate the reaction. Applicants respectfully disagree.

Henning discloses polyisocyanate addition products, which contain a quantity of incorporated sulphonate and/or carboxylate groups and optionally ethylene oxide units, incorporated in a polyether chain to guarantee the solubility or dispersibility thereof in water. Diisocyanates corresponding to  $Q(NCO)_2$ , where Q represents an aliphatic hydrocarbon radical having 4 to 12 carbon atoms, a cycloaliphatic hydrocarbon radical having 6 to 15 carbon atoms, an aromatic hydrocarbon radical having 6 to 15 carbon atoms or an araliphatic hydrocarbon radical having 7 to 15 carbon atoms are used to make the addition products.

Taken alone, and as the Examiner states on Page 11 of the first Office Action, Henning does not disclose or suggest using a metal-salt catalyst. However, the Examiner incorrectly relies on Brahm to provide such disclosure.

As stated above, Brahm directs one skilled in the art to catalysts that are useful when olefinically unsaturated reactants are present. However, Henning discloses that the isocyanates which can be used are aliphatic, cycloaliphatic, aromatic, or araliphatic (col. 3, lines 36-54). One skilled in the art would not reasonably look to Brahm to identify compositions that would provide alkyl and/or aromatic polyisocyanate containing acylurea groups because Brahm was not directed to such materials. So there is no motivation to combine references as the Examiner has.

The teaching, motivation or suggestion to make alkyl and/or aromatic polyisocyanates containing acylurea groups using the presently claimed process and the reasonable expectation of success for such are not found in the combination of Henning and Brahm. Therefore, the rejection of Claims 1-21 under 35 U.S.C. § 103(a) should be withdrawn.

Claims 1, 2, 11, and 12 stand rejected under 35 U.S.C. § 103(a) as being obvious over JP 6-172518 (hereinafter "JP 518"). Although the Examiner does not indicate that JP 518 is taken in view of Brahm, the Examiner states such in the third full paragraph of page 4. The Examiner indicates that although JP 518 does not disclose using a catalyst, it would have been obvious to use the catalyst of Brahm in the process of Henning in order to accelerate the reaction. Applicants respectfully disagree.

Mo-6801

- 9 -

JP 518 is directed to a resin formed by reacting an aromatic dicarboxylic acid with an aromatic diisocyanate, an aliphatic diisocyanate and a blocking agent.

Taken alone, and as the Examiner states on Page 12 of the first Office Action, JP 518 does not disclose or suggest using a metal-salt catalyst. However, the Examiner incorrectly relies on Brahm to provide such disclosure.

As indicated above, Brahm directs one skilled in the art to catalysts that are useful when olefinically unsaturated reactants are present. However, JP 518 discloses that the isocyanates which can be used are aromatic and aliphatic (Office Action, Page 12). One skilled in the art would not reasonably look to Brahm to identify compositions that would provide alkyl or aromatic polyisocyanates containing acylurea groups because Brahm was not directed to such materials. So there is no motivation to combine references as the Examiner has.

An object of the present invention was to provide a catalyst for the reaction of isocyanates with carboxylic acids that leads to clear (i.e., without any turbidity) and only weakly colored products (i.e., APHA < 120). This aim was achieved by metal catalysts claimed in the present invention. No combination of the cited references discloses (explicitly or implicitly) the combination according to the present invention or teaches it to obtain polyisocyanates having acylurea groups exhibiting the desired properties.

The teaching, motivation or suggestion to make alkyl and/or aromatic polyisocyanates containing acylurea groups using the presently claimed process and the reasonable expectation of success for such are not found in the combination of JP 518 and Brahm. Therefore, the rejection of Claims 1, 2, 11, and 12 under 35 U.S.C. § 103(a) should be withdrawn.

**CONCLUSION**

Because Brahm only discloses the limited application of using metal catalysts with olefinic isocyanates and olefinic carboxylic acids and it does not suggest or provide any motivation to use such catalysts with isocyanates and alkyl or aromatic carboxylic acids, it does not render the present claims obvious. Further, because there is no disclosure in Brahm to use the metal catalyst with other than olefinic materials, there is no motivation provided in Brahm to expect success or to use the catalyst with non-olefinic materials. Therefore, relying on Brahm to modify systems using isocyanates with alkyl and/or aromatic carboxylic acids is not proper and does not provide a *prima facie* case of obviousness.

Therefore, none of the claims are obvious over the cited prior art.

Applicants assert that the claims are now in form for allowance and respectfully request that a timely Notice of Allowance be issued in this application.

Respectfully submitted,

By



Gary Matz  
Agent for Applicants  
Reg. No. 45,504

Bayer Polymers LLC  
100 Bayer Road  
Pittsburgh, Pennsylvania 15205-9741  
(412) 777-3897  
FACSIMILE PHONE NUMBER:  
(412) 777-3902  
lo/MATZ/gfm136

Mo-6801

- 11 -